Agroforestry: Good for Yields, Good for the Environment

Abdala Liingilie checks on a test field of maize in Tanzania.(Courtesy photo)

By integrating tree crops into your farm and ranch land, you can improve your harvests, diversify your income and help fight the effects of climate change in the process.

The land use system known as agroforestry is already being used across Africa to help replenish depleted soils. By growing "fertilizer trees," such as species of acacia, farmers are adding nitrogen to the soil and increasing their grain production by two or three times, while the trees help absorb carbon emissions contributing to climate change and provide wildlife habitats.

One of your fellow YALI Network members, Tanzania's Abdala Liingilie, has been encouraging agroforestry among farmers in the Kongwa and Kiteto districts who usually grow maize, beans, sunflower, ground nuts and finger millet.

With support from the World Agroforestry Centre and the U.S. Agency for International Development, Liingilie ran six research trials and helped train 250 farmers during the 2013–2014 growing season. In 2015, he mobilized more than 650 farmers to work in intercropping trials. The group planted about 300,000 tree seedlings among crops and houses.

Farmers who adopt agroforestry can expand their income opportunities, Liingilie said. For example, by having both trees and crops on their land, they can raise bees and then sell their beeswax and honey. By planting trees as canopies for ground crops they can earn money by selling the trees' high-value fruit, timber and resins.

Agroforestry can also include these other benefits:

- Improved water quality through reduced nutrient and soil runoff.
- An increased number of drought-resistant trees, including those that produce fruits, nuts and edible oils.
- Home-grown wood fuel, reducing deforestation and pressure on woodlands.
- Less need for need for insecticides, herbicides and other toxic chemicals.
- Increased crop stability.

The type of agroforestry you pursue can depend on the land conditions and your goals:

- Alley cropping: planting trees between rows of already grown shrubs or trees.
- Riparian forest buffers: planting trees next to bodies of water.
- Silvopasture: sustainable integration of grazing land and forestry.
- Windbreaks: planting trees or shrubs to manage the effect of wind on erosion and soil moisture.

Here is a link to resources and contacts on how to get your agroforestry project underway in different African regions.

Liigilie's advice for other YALI Network members is simple: "Don't give up. … Changes start with

you. Be ready to handle them in positive ways.”

Want healthier soil? Don’t plow your fields.

Maize field growing in mulch from a previous crop in Malawi (FAO)

If you have been farming for years, it may be difficult to break from the tradition of plowing your fields and feeding crop residue like maize stalks or wheat stubble to livestock rather than leaving it in place. But climate change is forcing many to rethink their traditional farming methods, and the practice of conservation tillage (also called conservation agriculture) has been shown to reduce soil erosion and retain moisture for plant roots. It also saves labor!

Conservation tillage methods include no-till, strip-till, ridge-till and mulch-till.

- No-till and strip-till involve planting crops directly into residue from the previous season’s crop that hasn’t been tilled (no-till) or has been tilled only in narrow strips with the rest of the field left untilled (strip-till).
- Ridge-till involves planting row crops on permanent ridges about 12 centimeters high. The previous crop’s residue is cleared off ridges into adjacent furrows. Maintaining the ridges is essential.
- Mulch-till is a method that leaves at least 30 percent of the soil surface covered with crop residue.

The goal with all of these methods is to minimize soil disturbances. This helps to build the soil’s health and its ability to hold moisture, allowing crops to grow better during dry weather extremes. Farmers also benefit by:

- Reducing soil erosion by as much as 60 percent, depending on the tillage method and amount of residue left to shield soil from rain and wind.
- Adding healthy organic matter to soil.
- Decreasing their expenditures on fuel and planting because fewer tractor trips across the field are needed.
- Reducing potential air pollution from dust and diesel emissions.
- Reducing soil compaction that can interfere with plant growth.

Over time, conservation tillage accompanied by crop rotation and the use of cover crops has been shown to increase harvest yields, in addition to helping the soil. The U.N.’s Food and Agriculture Organization (FAO) did a case study in Tanzania that showed that by the sixth season, crop yields had increased from three bags of maize and one to two bags of beans per acre to 30 bags of maize and 10 bags of beans per acre.

Interested in learning more? Here are some practical steps from an FAO publication to get you started.
